An Economist's Perspective on Urban Sprawl, Part 1

Defining Excessive Decentralization in California and Other Western States

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Defining Excessive Decentralization in California and Other Western States

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Executive Summary

For more than 60 years, urban planners have chosen the catch phrase "urban sprawl" to denote the seemingly unwieldy growth that many people associate with suburban development in metropolitan areas. On the other hand, perceived positives about suburban lifestyles – roomier houses, less expensive land, broader open spaces, sometimes better schools – hold strong draws for many Californians. As development continues on the urban fringes, one person's sprawl becomes another person's backyard.

Questions abound in California about how best to accommodate nearly 50 percent more people in little more than a generation. The U.S. Census Bureau anticipates 49.3 million residents will be calling themselves Californians in 2025, compared with about 34 million in 2000.

This paper is intended to offer a better understanding of the incidence of urban sprawl in California with the goal of helping decision-makers chart effective policies for dealing with it. The paper offers an economic way of thinking about urban sprawl, or decentralized growth. Given the available data, it develops a method for quantifying the degree of sprawl in metropolitan areas. Figures in the Appendix provide these values for the 25 metropolitan regions in California and for other metropolitan areas throughout the western United States. Some conclusions are then drawn from this data.

Statewide averages suggests urban sprawl in California is no better or worse than in other western states, but these statewide averages can be misleading. Sprawl varies widely from region to region in California, and by some measures occurred during the 1980s and 1990s in the majority of the state's 25 metropolitan areas.

What Is Sprawl?

In its broadest sense, urban sprawl is just a popular phrase for excessive metropolitan decentralization or suburbanization. From an economist's point of view, the least value-laden way to determine when suburbanization (or non-central place development) has become excessive is to calculate whether the decentralization imposes higher costs than benefits to the entire metropolitan area.

As an economist is quick to point out, urban sprawl is the result of thousands of individual choices. In effect, the negative outcomes attributed to urban sprawl can be thought of as the summation of the many public costs that individuals and businesses usually choose to ignore when deciding upon a location in a metropolitan area.

Suburbanization is popularly conceptualized in a way that virtually ensures total costs will be greater than total benefits. Low-density suburbs scatter and disperse development in inefficient ways, distancing people's homes from their workplaces while frequently failing to optimally use the open spaces in between. But there are private benefits to suburbanization (bigger homes on more land, access to "better" schools, closer to open space, neighbors more likely to be like oneself, etc.) that are often forgotten in many debates on this issue. These benefits also need to be considered when assessing the overall desirability of suburbanization.

The difficulty in implementing the previously discussed economic method of recognizing urban sprawl prevents its explicit use as the method used here to identify the occurrence of urban sprawl in western metropolitan areas. Instead, the method used here is a "second-best" approach of using data to identify urban development where the results of a specific pattern is more likely to confer greater costs upon a region than benefits. These patterns are identified through a review of the economic and planning literature on the topic of urban sprawl.

Findings

This study analyzed data from metropolitan and urban areas in the states of Washington, Oregon, California, Nevada, Arizona, New Mexico, Colorado, and Utah. Data from the 1990 census often was the most recent available, but more timely figures were used whenever possible.

When statewide averages were used, California's metropolitan areas always fell in the middle of other western states in degree of sprawl. This is likely due to the sheer size of California and the fact that it contains nearly half of the total metropolitan areas in the West. That said, there are clear indicators in the tables offered in the Appendix of this study that some of California's metropolitan areas not only are more sprawled than others, but are more sprawled than most metropolitan areas in the American West. By this accounting, the metropolitan

areas of Fresno, Los Angeles, Riverside, Merced, Sacramento, Oakland, San Francisco, San Luis Obispo, and Stockton experienced the state's greatest increases in urban sprawl during the 1990s.

Sprawl Index

Using a sprawl index developed for this paper, a value greater than one indicates that land in the fringe of an urbanized area grew at a faster rate over a decade than the population in the entire urbanized area. When this occurred, it meant that more and more people were living at lower density levels outside of the metropolitan area's central places.

- The 1980-to-1990-sprawl index for all of the United States was less than one. In other words, urban fringes as a whole did *not* grow disproportionately faster than the population of metropolitan areas.

- However, in California, average metropolitan growth in urban fringes between 1980 and 1990 were twice as great as growth in the urban population. While this statewide metropolitan average masks significant variations among California's metropolitan areas, it does illustrate that the statewide development during the 1980s can in this sense be commonly characterized as sprawl.

Farmland Trends

Metropolitan land devoted to farming is the only widely available measure of how much open space exists in any given metropolitan area.

- Between 1987 and 1997, the average percentage of a California metropolitan area's land devoted to farming fell by about 9.4 percent. But trends in specific metropolitan areas varied widely, from farmland losses of -53 percent in Los Angeles and -46 percent in Orange, to farmland gains of 29 percent in Santa Cruz and 12 percent in Salinas.

Populations in Central Places

Central places are the dominant employment and residential centers in urbanized areas. The stability of their populations reflects the strength of a region's core; conversely, any relative declines point to growth on the urban fringes and potential sprawl.

- In 1970, 54 percent of the U.S. population living in metropolitan areas chose to live in their urban areas' central places. In 1990, this measure fell to 50 percent.

- In 1970, 41 percent of the land in U.S. metropolitan areas was located in central places; by 1990, this percentage had fell slightly to 39 percent.

- On average, between 1970 and 1990, California's metropolitan areas experienced an increase in central-place activity. But over this same period, 13 of California's 25 urbanized areas (Antioch, Los Angeles, Oxnard, Palm Springs, Riverside, Sacramento, Salinas, San Diego, Santa Barbara, Santa Cruz, Santa Rosa, Seaside, and Simi Valley) experienced a decrease in the percentages of population and land area in central places.

Retail Activity

The percentage of metropolitan retail activity in central places is used in this study as an inverse measure of sprawl in urban areas. In other words, stronger activity in central places means less sprawl on the fringes.

- Eight of California's 25 metropolitan areas exhibited a positive increase in central-place retail activity between 1987 and 1997, although the overall state average reflected a loss. The Chico metropolitan area experienced the greatest increase at its core (57 percent), while Santa Cruz experienced the greatest decrease (-31 percent).

Conclusions

The analysis contained in this paper offers a mixed picture on the degree of excessive decentralization or sprawl in specific metropolitan areas in the western United States. Without future intervention, in some of California's most populous regions, continued excessive decentralization will mean higher social costs than otherwise necessary as the state's population grows by nearly half again in the next 25 years.

In theory, if a type of suburbanization generates more private and public costs than it does private and public benefits, it is excessive. In reality, an exact measurement of all the costs and benefits associated with any type of suburbanization is difficult, if not impossible, to make.

If policymakers keep in mind that all forms of decentralization yield benefits and costs, they can eliminate from consideration many of the value-laden concepts that frequently hinder objective discussions of sprawl.

Population growth in California appears inevitable, but in many respects we should not fear it. What we do need to fear is growth that is allowed to proceed in a manner that fails to maximize the benefits to be derived from it, and fails to minimize the costs that can arise from it.

Public policymakers can advocate and institute approaches designed to steer California's growth in a manner that maximizes the benefits of growth while minimizing the costs. If further development at current central place locations produces greater social and private costs than social and private costs, policymakers should find ways to reward individuals and businesses for choosing to locate in central places. Or, conversely, California's policymakers could create disincentives for locate at the urban fringe by encouraging people and businesses to more fully consider the social consequences of decentralized location choices.

The state may also want to consider changing the fact that California local governments retain a portion (one percent) of locally generated sales tax revenue. As shown in Wassmer (2001), this *situs*-based retention encourages local land-use decisions that generate greater sprawl. Such economic approaches to slowing sprawl by no means call for a ban on where people and businesses may locate, only that they factor in the social costs imposed upon others when choosing urban-fringe locations.

Since the social benefits and costs of location decisions extend beyond city and county borders, a regional strategy for dealing with excessive decentralization is the ideal. Unfortunately, metropolitan areas in California, like most throughout the United States, lack a uniform and binding regional governance structure to facilitate this approach.

Section 1: Awakening to Urban Sprawl

> *In the next three or four years, Americans will have a chance to decide how decent a place this country will be to live in, and for generations to come. Already, huge patches of once-green countryside have been turned into vast smog-filled deserts that are neither city, suburb, nor country and each day – at a rate of some 3,000 acres a day – more country is being bulldozed over… It is not merely that the countryside is receding; in the great expansion of the metropolitan areas, the subdivisions of one city are beginning to meet up with the subdivisions of another.*
>
> **--William Whyte, sociologist, January 1958**

Even though Whyte deplored the phenomenon more than 40 years earlier, Earle Draper of the Tennessee Valley Authority used the term "sprawl" in an even earlier 1937 speech. Draper told a national conference of planners: "Perhaps diffusion is too kind of word.… In bursting its bounds, the city actually *sprawled* and made the countryside ugly, uneconomic [in terms] of services and doubtful social value."

Since then, planners have used the term sprawl to categorize much of what people dislike about suburban life in metropolitan areas: loss of open space and farmland, traffic congestion, air pollution, central-city blight and greater percentages of the poor concentrated in the inner cities. The public now uses the term sprawl as a shorthand way to describe nearly all urban public-policy concerns. Such concerns are expected to be especially acute in California as it grows its way to a projected population increase of 50 percent, or 49.3 million people, by 2025.

Ken Small (2000), an urban economist, offers an interesting medical analogy. He says we all recognize the undesirable symptoms of the "disease" of sprawl. Potential remedies, under the label "smart growth," are often suggested, but few of us understand the disease well enough to truly cure it.

To better understand the disease, ways are needed to assess the degree to which urban sprawl has occurred in metropolitan areas. Once this measurement is established, factors cited as causes of urban sprawl can be tested for validity. If found appropriate, these tests then form the basis for public policies designed to reduce sprawl and its negative consequences.

Defining Urban Sprawl

Suburbanization occurs over time as larger percentages of a metropolitan area's residential and/or business activity occurs outside its central locations. In its broadest sense, urban sprawl is shorthand for "excessive" metropolitan decentralization. But determining when urban decentralization has become excessive is no easy task.

As discussed by two prominent urban economists, Ed Mills (1999) and Jan Bruekner (2000), the process of suburbanization has occurred steadily in the United States for well over 75 years. In 1950, 57 percent of the population lived in the single central cities that comprised the designated metropolitan areas in the United States. Seventy percent of the country's jobs were in these central cities. By the mid-1990s these percentages had respectively declined to 35 and 45 percent.

Urban economists have extensively documented, modeled, and statistically examined this occurrence. They've concluded that the suburbanization of the 20th century occurred as a result of population growth, rising incomes, falling commuting costs and, to some extent, changing tastes in where and how Americans wish to live, work, and shop.

Higher-income residents typically demand bigger houses with more land. Cheaper land for roomier homes tends to be on the fringes of already-developed urban areas. Federally subsidized highways and relatively low private costs for using automobiles to get to work make it easier to move to the suburbs. In addition, many people and businesses seem to prefer suburban settings, although there is some debate over whether this preference is at least in part induced by the limited choices available to them (see Ewing, 1997).

An Economic Concept of Urban Sprawl

To identify when suburban development becomes sprawl, we must be able to determine the point at which further decentralization of a metropolitan area becomes excessive. From an economist's point of view, the least value-laden way to do this is to determine when further decentralization imposes greater total costs on everyone in the metropolitan area than if development had remained more centralized.

An economist's definition of the costs of metropolitan decentralization includes:

- The *private* costs born by individuals and businesses that make the decisions to locate in more decentralized places in a metropolitan area.

- The *public* costs that result from the decisions of others to locate in decentralized places.

Public and private benefits that result from locating in decentralized places are subtracted from the above costs to achieve a figure that represents the total net costs of decentralized location decisions.

This form of economic thinking can help us understand why a household, new to a metropolitan area, would decide to live in the outer suburbs even if the primary wage-earner(s) work in the central city.

The household makes this decision by weighing the private benefits of a decentralized location (possibly better public schools, cheaper land on which to build a larger house, newer infrastructure, neighbors like themselves, public open spaces) against the private costs of the decentralized location. Private costs could include possibly longer commute times and fewer urban amenities such as cultural centers or fine shops. In this example, the household chooses the urban fringe after determining its private benefits are greater than its private costs. In making this choice, the household is unlikely to fully consider the social costs of its decision on the entire metropolitan area. These publicly shared social costs could include greater air pollution and more freeway congestion from the longer commute, increased need for repairing and expanding streets and highways in the outer suburbs, and the social and economic isolation of those left behind at the core of the metropolitan area.

Given that many metropolitan residents do choose the suburbs, many metropolitan businesses also determine that their "bottom-line" dictates low-density sites spread out over the metropolitan area for ease of access to customers, employees and shipping.

Negative outcomes attributed to urban sprawl are, in effect, a summation of the many public costs that individuals and businesses generally choose to ignore when they decide to locate at the fringe of an urban area. Also frequently ignored in making these decisions are the social benefits that might have been generated if households and businesses had chosen more centralized locations. Economists refer to these privately ignored social costs and benefits as externalities.

To determine when suburbanization is becoming excessive, economists must try and account for these externalities. If the total costs (private and public) of decentralization are greater than the total benefits (private and public), the development could be determined excessive, or sprawl.

To an economist, urban sprawl results from thousands of individual choices. If we consider that many households prefer low-density living, spatial separation from others with lower incomes and social status, one-stop shopping, a location near open space; and that travel by private car is faster, cheaper, and safer than mass transit, it's not surprising that many households end up choosing locations on the less-developed fringe of urban areas.

The important question to ask is if these same urban-fringe households would have chosen to live in more central locations if they were asked to bear the social costs of their choice of residence. If after having to pay these social costs, which they are know able to ignore, the household would instead choose a more central location, then the economist would consider the decision to locate at the urban fringe an expression of urban sprawl.

Quantifying Urban Sprawl

The just described economic method of recognizing urban sprawl is theoretically sound, but extremely demanding to implement. It is very difficult to measure all of the private and public, benefits and costs that occur when decentralization becomes greater in a metropolitan area.

It's a bit like defining pornography. We all know that some forms of decentralized development create more public and private costs than benefits. The difficulty, as with pornography, is in creating a specific standard that identifies what fails this rather obvious test.

Planners identify sprawl largely through descriptions of specific types of undesirable urban development. Using existing data sources, there are no easy ways to directly measure these types of development in metropolitan areas. Nonetheless, there are measurable characteristics that do appear in the previous literature of what planners considers sprawl. These include:

- Low density, scattered, and/or dispersed development.
- A separation of where people live from where they work.
- A lack of functional open space.

This paper relies on these characteristics to determine when excessive decentralization or urban sprawl has occurred in a western United States metropolitan area. We realize that this is a "second-best" approach and would prefer to use the previously discussed economic method of recognizing urban sprawl. The problem in pursuing the better approach is the absence of explicit data to measure the total benefits and costs of a specific type of metropolitan development.

The next important step to identify the occurrence of urban sprawl in the American West is to define what an urban area is.[1] For this study, western urban

[1] The Census Bureau defines U.S. metropolitan areas (metropolitan statistical areas or MSAs) by a central city and the surrounding county or counties that are economically integrated with it. The Census Bureau also defines "urbanized area" that consists of the densely settled central place in the metropolitan area, plus the less densely settled territory (urban fringe) that surrounds it. An urbanized area must have a minimum population of 50,000 and the area's fringe must have a density of at least 1,000 persons per square mile. The

areas are the 61 metropolitan statistical areas in what the Census Bureau defined in 1990 as the continental western United States, less the seven metropolitan areas in Idaho, Montana, and Wyoming. Metropolitan areas in the included western states developed during an era of rising populations, rising real incomes, and declining transportation costs. Unlike metropolitan areas in other parts of the United States, this resulted in lower population densities at the urban core. Metropolitan areas in Idaho, Montana and Wyoming are excluded because urban development patterns differ in these three states differ significantly from the prevalent pattern of western metropolitan urban development in Arizona, California, Colorado, New Mexico, Nevada, Oregon, Utah, and Washington States.[2]

The Appendix's Table 1 contains a description of metropolitan areas in California and the western United States:

- Column 1 provides the metropolitan area's name and whether the Census Bureau considers it a metropolitan statistical area (MSA) or a primary metropolitan statistical area (PMSA).[3]

- Column 2 lists the square miles of each metropolitan area.

- Column 3 contains the names of the 1990 component counties for each MSA or PMSA.

- Column 4 offers the names of the 1990 census-defined "urbanized areas" that are included in each metropolitan area.

- Column 5 provides the 1990 census-defined "central places" that are in each of the urbanized areas.[4]

To get a feel for the degree of sprawl in a metropolitan area, the metropolitan area's level of decentralization at a given point in time must be compared with its level at an earlier time, as well as with the degree of decentralization in similar metropolitan areas. In the next section, this is done for metropolitan areas in California and other western states.

Census Bureau considers central places to be the dominant employment and residential centers in each urbanized area.

2 The largest central cities in each of these excluded states only had 1992 populations of 136,000, 84,000, and 52,000 respectively.

3 A PMSA consists of integrated counties that are divisible into smaller, integrated units that consist of one or more counties. A MSA consists of counties that are not divisible into smaller, integrated units.

4 In this study, the census-defined central places in 1990 are considered the central places for all years under consideration. There are two urbanized areas (Logan, UT, and Longview, WA) that are not part of any census-defined metropolitan area.

Section II: Urban Decentralization in California and the Western United States

Tables 2 through 5 in the Appendix offer various ways of measuring the amounts of decentralization and open space loss that have occurred in the last three decades in the western United States. The average for all the metropolitan areas in each state is listed in the top rows of each table.

Tables 2 and 3 are based upon information drawn from a state's urbanized areas. (This information is only available for decennial census years and the data for 2000 has not been released yet.) Alternatively, Tables 4 and 5 rely on metropolitan areas (or counties) for their unit of observation and therefore report information from as recently as 1998.

A Comparison Among Urbanized Areas

Central places are the dominant employment and residential centers in an urbanized area. Measures of the percentage of an urbanized area's population and land area in its central places offer a comparable indication of how centralized an urban area is.

Measured in this manner, less centralized urban areas are more likely to exhibit many of the characteristics of sprawl, some of them previously discussed: dispersed development outside of compact urban villages, low-density development in new growth areas, residential inaccessibility to employment, and greater strip commercial development.

An examination of the percentage of an urbanized area's population and land area contained in its central places at one point in time, and how that has changed over time, offers information on the degree that an urban area is and has sprawled.

For instance, the first data row of Table 2 indicates that 54 percent of the U.S. population living in urbanized areas chose to live in their central places in 1970. By 1990, this percentage had fallen to 50 percent. Similarly, in 1970, 41 percent of the land in U.S. urban areas was located in its central places; by 1990, this percentage had fallen to 39 percent.

Only the metropolitan averages calculated for the states of California and Oregon bucked this U.S. trend. But in a state as large and diverse as California, it is difficult to draw generalizations from statewide averages.

Table 2 demonstrates that statewide averages mask specific changes in metropolitan areas within a state. For instance, 13 of California's 25 metropolitan areas (Antioch, Los Angeles, Oxnard, Palm Springs, Riverside, Sacramento, Salinas, San Diego, Santa Barbara, Santa Cruz, Santa Rosa, Seaside, and Simi Valley) experienced a decline in both the percentages of population and land area in central places, or greater sprawl.

Yet the state's metropolitan areas on average experienced a decrease. The obvious lesson for California policymakers is that blanket statements on the degree of sprawl in the state's metropolitan areas are not valid.

Table 3 offers the percentage change in urban population, and the percentage change in urban fringe land, that occurred in California and other urbanized areas in the western United States between 1980 and 1990. An index of the degree of sprawl is calculated – employing a formula used by Landis (2000) and other planners – by dividing the percentage change in urban fringe land (or non-central place land) by the percentage change in total urban population.

A value *greater* than one indicates that, between 1980 and 1990, that land at the urban fringe grew at a faster rate than the population in the entire urbanized area. When this has occurred, it means more and more people are living at lower density levels outside of the area's central places. This index offers another way of quantifying the relative degree of sprawl across different areas.

The top of Table 3 indicates that the 1980-to-1990-sprawl index for all of the United States was *less* than one. Four of the eight states in this western sample were, on average, different than the rest of the United States. In California, average metropolitan growth in urban fringe land was twice as great as growth in urbanized population. Again, the degree of sprawl occurring across California's metropolitan areas differed greatly. At one extreme was a ratio of fringe land to population growth of 21.4 in the Simi Valley and 14.7 in Salinas – representing a large increase in sprawl. At the other extreme were ratios of -0.7 in Riverside and -0.5 in San Bernardino – representing an actual decrease in sprawl.

A Comparison Among Metropolitan Areas

Data from census-designated urbanized areas, and the central places they contain, represents perhaps the best widely collected information for assessing the degree of decentralization or sprawl.

Unfortunately, the most recent data from U.S. urbanized areas is from 1990. Since many claim that sprawl has escalated in the last decade, it is important to look at some measures drawn from the 1990s. For these we turn in Tables 4 and 5 to the county-based Census definition of metropolitan areas.

Since many lament the loss of open space in metropolitan areas as a clear symptom of urban sprawl, Table 4 offers a comparable measure of farmland losses in metropolitan areas in the western United States between 1987 and 1997.

Metropolitan land devoted to farming is the only widely available measure of the occurrence of open space in a metropolitan area. The first two data columns of Table 4 list the fraction of total metropolitan land devoted to farming in 1987 and in 1997. The third data column offers the percentage change in this fraction between 1987 and 1997.

As the first rows of Table 4 show, only metropolitan areas in New Mexico and Washington States experienced statewide increases in the percentage of land in metropolitan areas devoted to farming. Washington's average increase was due to a large jump in one metropolitan area (Bremerton).

Over this 10-year period, the average percentage of a California metropolitan area's land devoted to farming fell about 9.4 percent. But specific metropolitan areas varied from respective losses in farmland of -53 percent and -46 percent in Los Angeles and Orange, to respective farmland gains of 29 percent and 12 percent in Santa Cruz and Salinas.

Table 4 also continues the practice from Table 2 of looking at how central-place populations, relative to total area populations, changed over time. Here, the difference is that all counties in the census-defined metropolitan areas account for the total urban area and data is available from 1998. As shown in the top row, in both 1990 and 1998 nearly the same percentages of the state of California's metropolitan populations were living in central places. Meanwhile, the averages across all of the metropolitan areas of Colorado, Oregon, Utah and Washington indicate that relatively fewer were living in central places in these states.

As with earlier tables, Table 4 also shows that state metropolitan averages hide great differences in losses in central-place populations. For California, between 1990 and 1998, the Oakland metropolitan area led in central-place population loss with nearly a 10 percent decline in metropolitan residents living in the cities of Alameda, Oakland, or Berkeley.

In fact, 13 out of California's 25 metropolitan areas exhibited a decline in central-place populations relative to total metropolitan populations. At the same time, the Chico metropolitan area experienced a 10 percent increase in metropolitan residents who chose to live in the area's central place (Chico).

Finally, Table 5 of the Appendix offers a different perspective on decentralization in the western United State's metropolitan areas. It looks at what percentage of a metropolitan area's retail activity (measured in values of sales in real dollars) occurred in its central places, and how that changed between 1977, 1987, and 1997. Percentages of total metropolitan retail activity in central places are used here as inverse measures of the degree of sprawl in an urban area. The "big-box" and "strip-mall" ways in which retail activity often occurs in the suburbs represents much of what planners and the public perceives as sprawl.

On average, for all of California's metropolitan areas, retail activity in central places over the 20-year period between 1977 and 1997 declined by 4.7 percent. Statewide declines for this period were also observed in Arizona, Colorado, Utah, and Washington.

On average, metropolitan areas in Nevada, New Mexico and Oregon saw an increase in the percentage of retail sales occurring in central places.
As with the information contained in previous tables, these statewide metropolitan averages mask broadly varying changes across the metropolitan areas in western states.

Even though the average loss in retail activity in central places in California was negative, eight of the state's 25 metropolitan areas exhibited an increase in central place retail activity. The Chico metropolitan area experienced the greatest increase at its core (57 percent), while Santa Cruz experienced the greatest decrease (-31 percent).

Section III: Lessons from California's Sprawl Data

This section draws upon the previously described economic way of thinking about urban sprawl, as well as on the types of urban-growth patterns best characterized as sprawl, to offer a "scorecard" relevant to determining the degree of urban decentralization that has occurred in California and the American West during the last decade.

It should be made clear that this information is by no means a perfect measure of the degree of sprawl in a specific area. This data is best considered in the context of comparisons with the same metropolitan area over time, or similar areas in the western United States.[5] Before getting to one final way of comparing the multiple measures of sprawl, some general points about urban sprawl in California need to be made.

In comparing the statewide metropolitan averages at the top of the Appendix's Tables 2 through 5, California's averages nearly always fall somewhere in the middle of other western states. On average, California is neither extreme in terms of excessive sprawl, or in terms of lack of sprawl. Perhaps this is due to its great size and the fact it contains nearly half of the metropolitan areas in the West. That said; there are clear indicators that some of California's metropolitan areas are more sprawled than other Western urban areas.

Finally, the table below offers a "scorecard" that summarizes three different measures of urban sprawl taken from previous tables. In this table a negative value represents a greater likelihood that sprawl occurred in the 1990s (the larger the negative number, the greater the likelihood of sprawl). For this scorecard, all negative values have been placed in bold, and the number of negative values out of three possible listed in the final column.

By this accounting, Fresno, Los Angeles, Riverside, Merced, Sacramento, Oakland, San Francisco, San Luis Obispo, and Stockton experienced the greatest increases in urban sprawl during the 1990s.

[5] The statistical method of regression analysis can be used to determine if the degree of suburban activity in a metropolitan area is in some measure excessive. Wassmer (2001) does this for the retail activity in metropolitan areas in the western United States and has found that greater statewide reliance on local sales taxes is related to greater retail activity in suburban places, i.e. more than would be justified by the suburb's population, income, demographics, and land prices.

Sprawl Scorecard for California Metropolitan Areas During the 1990s

1990 Metropolitan Area Name	1987 to 1997 % Change in (Farm Land / Metro Land)	1990 to 1998 % Change in (Central Place Population / Metro Population)	1987 to 1997 % Change in (Central Place Retail Sales / Metro Retail Sales)	Degree of Sprawl Indicators
Bakersfield, MSA	**-6.11**	3.53	**-0.83**	2/3
Chico-Paradise MSA	**-18.27**	9.55	47.87	1/3
Fresno, MSA	**-7.67**	**-2.43**	**-7.57**	3/3
LA-Long Beach, PMSA	**-53.30**	**-0.60**	**-11.81**	3/3
Merced, MSA	**-15.97**	**-4.70**	**-0.85**	3/3
Modesto, MSA	1.79	**-2.86**	**-13.93**	2/3
Oakland, PMSA	**-8.06**	**-9.96**	**-23.92**	3/3
Orange, PMSA	**-46.63**	**-2.57**	8.66	2/3
Redding, MSA	**-16.06**	4.92	7.75	1/3
Riverside-San Bernardino, PMSA	**-34.07**	**-0.53**	**-3.56**	3/3
Sacramento, PMSA	**-22.33**	**-4.29**	**-16.61**	3/3
Salinas, MSA	11.51	5.50	**-6.65**	1/3
San Diego, MSA	**-10.39**	**-1.40**	1.99	2/3
San Francisco, PMSA	**-15.94**	**-1.86**	**-9.71**	3/3
San Jose, PMSA	**-8.30**	0.15	5.39	1/3
SLO-Ata.-P. Robles, MSA	**-9.87**	**-2.31**	**-27.77**	3/3
Santa Barb.-S. Maria-Lom., MSA	**-6.08**	0.77	5.64	1/3
Santa Cruz-Watsonville, PMSA	28.82	1.70	**-18.40**	1/3
Santa Rosa, PMSA	3.87	1.79	**-4.07**	1/3
Stockton-Lodi, MSA	**-1.81**	**-1.55**	**-12.03**	3/3
Vallejo-Fairfield-Napa, PMSA	**-0.86**	**-1.96**	2.06	2/3
Ventura, PMSA	5.26	**-2.88**	**-19.19**	2/3
Visalia-Tulare-Porterville, MSA	**-7.14**	5.18	**-1.29**	2/3
Yolo, PMSA	6.13	4.50	**-5.32**	1/3
Yuba City, MSA	**-3.79**	7.62	16.26	1/3

Section IV: Conclusion

Based upon economic theory, excessive suburbanization means that further development at a metropolitan area's urban fringe generates greater private and social costs than private and social benefits. In reality, an exact measurement of all the private and public, costs and benefits associated with a particular type of suburbanization is difficult, if not impossible. If policymakers keep in mind that all forms of suburbanization yield benefits and costs, they can eliminate from consideration many of the value-laden positions that tend to dominate discussions surrounding what is and what is not sprawl.

Economists do have something to contribute to the escalating debate on urban land use in the United States. The 15 million-plus additional people expected to arrive in California in the next 25 years will offer benefits to the state and its economy, including creation of new jobs, new incomes and new tax revenues. Though the arrival of this many more Californians also means that its 25 metropolitan areas will grow more populated.

Californians needn't fear growth itself, but they do need to fear growth that fails to maximize benefits while minimizing costs. Call it the opposite of smart growth, such dumb growth is what California can plan to avoid. A broader-based county and state government role in this process could help compensate for the dearth of authority for dealing with development issues that overflow the boundaries of cities and counties. Since the social benefits and costs of location decisions extend beyond local borders, a regional strategy would be the ideal. Regionally imposed governmental policies could encourage, through inducements and/or penalties, people and businesses to consider rather than ignore the public costs of their location decisions.

Policymakers may also want to consider changing the fact that California localities currently keep one percent of the values of sales occurring within their boundaries. Such a *situs*-based distribution likely encourages the fiscalization of local land-use decisions and generates greater retail sprawl in California (see Wassmer, 2001).

Perhaps the optimal role that California state government can play is to provide incentives for the creation of metropolitan-wide collaborative bodies (where they

do not already exist) to approach this issue with solutions tailored to region-specific needs across the state. If warranted by an externality-based argument, discussions to consider directing reinvestment into more centralized locations can be convened. Notice that centralized locations is plural. In almost every metropolitan area in California there are multiple locations that have become the centers of economic and residential activity in the urban area. Smart growth requires the continued steering of new growth to these existing central places, maintaining a jobs, housing, shopping balance within them; and trying to preserve some open space between them. Guiding these actions should be the tenet that, although difficult to measure, smart growth entails future urban development occurring where its public and private benefits outweigh its public and private costs.

As the previous data has illustrated, the need for state encouraged regional oversight to slow urban sprawl is greater in some of California's metropolitan areas than others.

Appendix

Tables and References

Table 1
Urban Area Definitions in the Western United States

1990 Metropolitan Area Name	1990 Square Miles in Metropolitan Area	1990 Counties in Metropolitan Area	1990 Urbanized Areas in Metropolitan Area	1990 Central Places (Cities) in Metropolitan Area
Phoenix-Mesa AZ, MSA	14,574	Maricopa AZ, Pinal AZ	Phoenix AZ	Mesa AZ, Phoenix AZ, Scottsdale AZ, Tempe AZ
Tuscon AZ, MSA	9,187	Pima AZ	Tucson AZ	Tucson AZ
Yuma AZ, MSA	5,514	Yuma AZ	Yuma AZ	Yuma AZ
Bakersfield CA, MSA	8,142	Kern CA	Bakersfield CA	Bakersfield CA
Chico-Paradise CA, MSA	1,640	Butte CA	Chico CA	Chico CA
Fresno CA, MSA	8,102	Fresno CA, Madera CA	Fresno CA	Fresno CA
Los Angeles-Long Beach CA, PMSA	4,060	Los Angeles CA	Lancaster-Palmdale CA, Los Angeles-Long-Beach CA, Oxnard-Ventura CA	Lancaster CA, Long Beach CA, Los Angeles CA, Pasadena CA
Merced CA, MSA	1,929	Merced CA	Merced CA	Merced CA
Modesto CA, MSA	1,495	Stanislaus CA	Modesto CA	Modesto CA, Turlock CA
Oakland CA, PMSA	1,458	Alameda CA, Contra Costa CA	Antioch-Pittsburgh CA, San Francisco-Oakland CA	Alameda CA, Berkeley CA, Oakland CA
Orange CA, PMSA	790	Orange CA	Los Angeles-Long Beach CA	Anaheim CA, Irvine CA, Santa Ana CA
Redding CA, MSA	3,786	Shasta CA	Redding CA	Redding CA
Riverside-San Bernardino CA, PMSA	27,270	Riverside CA, San Bernardino CA	Hemet-San Jacinto CA, Hesperito-Apple Valley-Victorville CA, Indio-Coachella CA, Los Angeles-Long Beach CA, Palm Springs CA, Riverside-San Bernardino CA	Hemet CA, Palm Dessert CA, Palm Springs CA, Riverside CA, San Bernardino CA, Temecula CA
Sacramento CA, PMSA	5,094	El Dorado CA, Placer CA, Sacramento CA	Sacramento CA	Sacramento CA
Salinas CA, MSA	3,322	Monterey CA	Salinas CA, Seaside-Monterey CA, Watsonville CA	Monterey CA, Salinas CA
San Diego CA, MSA	4,205	San Diego CA	San Diego CA	Coronado CA, Escondido CA, San Diego CA
San Francisco CA, PMSA	1,016	Marin CA, San Francisco CA, San Mateo CA	San Francisco-Oakland CA	San Francisco CA

Table 1, Continued

1990 Metropolitan Area Name	1990 Square Miles in Metropolitan Area	1990 Counties in Metropolitan Area	1990 Urbanized Areas in Metropolitan Area	1990 Central Places (Cities) in Metropolitan Area
San Jose CA, PMSA	1,291	Santa Clara CA	San Jose CA	Gilroy CA, Palo Alto CA, San Jose CA, Santa Clara CA, Sunnyvale CA
San Luis Obispo-Atascadero-Paso Robles CA, MSA	3,305	San Luis Obispo CA	San Luis Obispo CA	Atascadero CA, Paso Robles CA, San Luis Obispo CA
Santa Barbara-Santa Maria-Lompoc CA, MSA	2,739	Santa Barbara CA	Lompoc CA, Santa Barbara CA, Santa Maria CA	Lompoc CA, Santa Barbara CA, Santa Maria CA
Santa Cruz-Watsonville CA, PMSA	446	Santa Cruz CA	Santa Cruz CA	Santa Cruz CA, Watsonville CA
Santa Rosa CA, PMSA	1,576	Sonoma CA	Santa Rosa CA	Petaluma CA, Santa Rosa CA
Stockton-Lodi CA, MSA	1,399	San Joaquin CA	Lodi CA, Stockton CA	Lodi CA, Stockton CA
Vallejo-Fairfield-Napa CA, PMSA	1,582	Napa CA, Solano CA	Fairfield CA, Napa, Vacaville CA	Fairfield CA, Napa CA, Vacaville CA, Vallejo CA
Ventura CA, PMSA	1,846	Ventura CA	Los Angeles-Long Beach CA, Oxnard-Ventura CA, Simi Valley CA	San Buenaventura (Ventura) CA
Visalia-Tulare-Porterville CA, MSA	4,824	Tulare CA	Visalia CA	Porterville CA, Tulare CA
Yolo CA, PMSA	1,012	Yolo CA	Davis CA, Sacramento CA	Davis CA, Woodland CA
Yuba City CA, MSA	1,233	Sutter CA, Yuba CA	Yuba CA	Yuba CA
Boulder-Longmount CO, PMSA	743	Boulder CO	Boulder CO, Longmount CO	Boulder CO, Longmount CO
Colorado Springs CO, MSA	2,127	El Paso CO	Colorado Springs CO	Colorado Springs CO
Denver CO, PMSA	3,761	Adams CO, Arapahoe CO, Denver CO, Douglas CO, Jefferson CO	Denver CO	Denver CO
Fort-Collins-Loveland CO, MSA	2,601	Larimer CO	Fort Collins CO	Fort Collins CO
Junction CO, MSA	3,328	Mesa CO	Grand Junction CO	Grand Junction CO
Greeley CO, MSA	3,993	Weld CO	Greeley CO	Greeley CO
Pueblo CO, MSA	2,389	Pueblo CO	Pueblo CO	Pueblo CO
Las Vegas NV & AZ, MSA	39,370	Clark NV, Mohave AZ, Nye NV	Las Vegas NV	Las Vegas NV
Reno NV, MSA	6,343	Washoe NV	Reno NV	Reno NV

Table 1, Continued

1990 Metropolitan Area Name	1990 Square Miles in Metropolitan Area	1990 Counties in Metropolitan Area	1990 Urbanized Areas in Metropolitan Area	1990 Central Places (Cities) in Metropolitan Area
Albuquerque NM, MSA	5,944	Bernalillo NM, Sandoval NM, Valencia NM	Albuquerque NM	Albuquerque NM
Las Cruces NM, MSA	3,807	Dona Ana NM	Las Cruces NM	Las Cruces NM
Santa Fe NM, MSA	2,019	Los Alamos NM, Santa Fe NM	Santa Fe NM	Santa Fe NM
Eugene-Springfield OR, MSA	4,554	Lane OR	Eugene-Springfield OR	Eugene OR, Springfield OR
Medford-Ashland OR, MSA	2,785	Jackson OR	Medford OR	Medford OR
Portland-Vancouver OR, PMSA	5,028	Clackamas OR, Columbia OR, Multnomah OR, Washington OR, Yamhill OR, Clark WA	Portland-Vancouver OR-WA	Portland OR, Vancouver WA
Salem OR, PMSA	1,926	Marion OR, Polk OR	Salem OR	Salem OR
Provo-Orem UT, MSA	1,998	Utah UT	Provo-Orem UT	Provo UT, Orem UT
Salt Lake City-Ogden UT, MSA	1,618	Davis UT, Salt Lake UT, Weber UT	Salt Lake City UT, Ogden UT	Salt Lake City UT, Ogden UT
Bellingham WA, MSA	2,120	Whatcom WA	Bellingham WA	Bellingham WA
Bremerton WA, PMSA	396	Kitsap WA	Bremerton WA	Bremerton WA
Olympia WA, PMSA	727	Thurston WA	Olympia WA	Olympia WA
Richland-Kennewick-Pasco WA, MSA	2,945	Benton WA, Franklin WA	Richland-Kennewick-Pasco WA	Kennewick WA, Pasco WA, Richland WA
Seattle-Bellevue-Everett WA, PMSA	4,925	Island WA, King WA, Snohomish WA	Seattle WA	Auburn WA, Everett WA, Seattle WA
Spokane WA, MSA	1,764	Spokane WA	Spokane WA	Spokane WA
Tacoma WA, PMSA	1,678	Pierce WA	Tacoma WA	Tacoma WA
Yakima WA, MSA	4,296	Yakima WA	Yakima WA	Yakima WA

Table 2
Population and Land Information for Central Places and Urbanized Areas in California and the Western United States

1990 Urbanized Area Name	1970 Central Place Population / Urban Population	1980 Central Place Population / Urban Population	1990 Central Place Population / Urban Population	1970 Central Place Land / Urban Land	1980 Central Place Land / Urban Land	1990 Central Place Land / Urban Land
United States average for urbanized areas	0.54	0.48	0.50	0.41	0.36	0.39
California average for urbanized areas	0.59	0.61	0.67	0.53	0.55	0.59
Arizona average for urbanized areas	0.78	0.69	0.62	0.70	0.62	0.66
Colorado average for urbanized areas	0.77	0.74	0.74	0.66	0.60	0.65
Nevada average for urbanized areas	0.63	0.50	0.50	0.62	0.36	0.44
New Mexico average for urbanized areas	0.82	0.85	0.81	0.72	0.73	0.71
Oregon average for urbanized areas	0.58	0.59	0.77	0.49	0.56	0.62
Utah average for urbanized areas	0.53	0.43	0.45	0.41	0.32	0.31
Washington average for urbanized areas	0.59	0.56	0.54	0.48	0.46	0.37
Antioch-Pittsburg, CA	0.82	0.88	0.71	0.71	0.81	0.50
Bakersfield, CA	0.39	0.47	0.58	0.45	0.47	0.63
Chico, CA	na	0.51	0.56	na	0.56	0.69
Davis, CA	na	na	0.88	na	na	0.80
Fairfield, CA	na	0.84	0.77	na	0.84	0.88
Fresno, CA	0.63	0.66	0.78	0.53	0.65	0.75
Hemet-San Jacinto, CA	na	0.41	0.58	na	0.39	0.65
Hesperia-Apple Valley-Victorville, CA	na	na	0.89	na	na	0.89
Indio-Coachella, CA	na	na	0.95	na	na	0.99
Lancaster-Palmdale, CA	na	0.85	0.88	na	0.82	0.91
Lodi, CA	na	na	0.93	na	na	0.69
Lompoc, CA	na	na	0.67	na	na	0.27
Los Angeles-Long Beach, CA	0.43	0.35	0.42	0.38	0.28	0.33
Merced, CA	na	na	0.87	na	na	0.81
Modesto, CA	0.58	0.67	0.71	0.28	0.54	0.58
Napa, CA	na	0.86	0.91	na	0.84	0.83
Oxnard-Ventura, CA	0.67	0.69	0.49	0.63	0.63	0.29
Palm Springs, CA	na	0.49	0.31	na	0.41	0.29
Redding, CA	na	0.79	0.85	na	0.64	0.83
Riverside-San Bernardino, CA	0.42	0.41	0.33	0.37	0.35	0.29
Sacramento, CA	0.40	0.35	0.38	0.37	0.35	0.38
Salinas, CA	0.94	0.97	0.89	0.89	0.88	0.54
San Diego, CA	0.58	0.50	0.52	0.56	0.44	0.46
San Francisco-Oakland, CA	0.38	0.32	0.38	0.17	0.13	0.19
San Jose, CA	0.43	0.51	0.58	0.42	0.48	0.54
San Luis Obispo, CA	na	na	0.83	na	na	0.81
Santa Barbara, CA	0.54	0.50	0.47	0.57	0.42	0.39
Santa Cruz, CA	0.43	0.34	0.32	0.35	0.16	0.13
Santa Maria, CA	na	0.69	0.69	na	0.74	0.68
Santa Rosa, CA	0.67	0.61	0.58	0.52	0.52	0.50
Seaside-Monterey, CA	0.67	0.56	0.53	0.70	0.46	0.36
Simi Valley, CA	0.99	0.97	0.78	0.93	0.96	0.70
Stockton, CA	0.67	0.76	0.80	0.64	0.67	0.71
Vacaville, CA	na	na	1.00	na	na	0.99
Visalia, CA	na	0.84	0.90	na	0.84	0.85
Watsonville, CA	na	na	0.61	na	na	0.29
Yuba City , CA	na	0.31	0.36	na	0.19	0.25
Phoenix-Mesa, AZ	0.67	0.56	0.77	0.64	0.51	0.64
Tucson, AZ	0.88	0.73	0.32	0.76	0.57	0.50
Yuma, AZ	na	0.78	0.77	na	0.78	0.83
Boulder, CO	0.97	0.94	0.84	0.92	0.83	0.70
Colorado Springs, CO	0.66	0.78	0.80	0.68	0.73	0.72
Denver, CO	0.49	0.36	0.31	0.33	0.25	0.24
Fort Collins, CO	na	0.83	0.83	na	0.63	0.76
Grand Junction, CO	na	0.50	0.40	na	0.31	0.27
Greeley, CO	na	0.85	0.84	na	0.70	0.75
Longmount, CO	na	na	0.98	na	na	0.95
Pueblo, CO	0.94	0.93	0.93	0.71	0.75	0.78
Las Vegas, NV & AZ	0.53	0.38	0.37	0.43	0.30	0.27
Reno, NV	0.73	0.62	0.63	0.81	0.43	0.62
Albuquerque, NM	0.82	0.79	0.77	0.72	0.56	0.59
Las Cruces, NM	na	0.82	0.76	na	0.71	0.66
Santa Fe, NM	na	0.94	0.89	na	0.91	0.90
Eugene-Springfield, OR	0.55	0.58	0.83	0.47	0.53	0.79
Medford, OR	na	0.75	0.70	na	0.71	0.62
Portland-Vancouver, OR & WA	0.46	0.36	0.86	0.33	0.30	0.36
Salem, OR	0.73	0.66	0.69	0.67	0.71	0.73
Logan , UT	na	na	0.65	na	na	0.46
Ogden, UT	0.46	0.31	0.25	0.34	0.20	0.17
Provo-Orem, UT	0.76	0.74	0.70	0.56	0.50	0.44
Salt Lake City, UT	0.37	0.24	0.20	0.32	0.25	0.15
Bellingham, WA	na	0.90	0.88	na	0.88	0.73
Bremerton, WA	na	0.56	0.34	na	0.54	0.15
Longview, WA & OR	na	0.56	0.55	na	0.36	0.34
Olympia, WA	na	0.40	0.35	na	0.40	0.29
Richland-Kennewick-Pasco, WA	0.58	0.61	0.81	0.57	0.51	0.53
Seattle, WA	0.47	0.39	0.36	0.27	0.35	0.23
Spokane, WA	0.74	0.64	0.64	0.65	0.49	0.49
Tacoma, WA	0.46	0.39	0.36	0.37	0.26	0.21
Yakima, WA	0.70	0.61	0.62	0.51	0.36	0.40

Table 3
1980 to 1990 Change in Urbanized Area Population, Urban Fringe Land Area, and a Sprawl Index for California and the Western United States

1990 Urbanized Area Name	1980 to 1990 % Change in Urban Population (A)	1980 to 1990 % Change in Urban Population (B)	1980 to 1990 Measure of Sprawl Index (B / A)
United States average for urbanized areas	13.70	12.5	0.91
California average for urbanized areas	47.04	103.44	2.01
Arizona average for urbanized areas	33.63	13.25	0.52
Colorado average for urbanized areas	19.30	36.88	2.17
Nevada average for urbanized areas	46.40	8.58	0.04
New Mexico average for urbanized areas	29.30	59.57	1.84
Oregon average for urbanized areas	15.31	3.14	-2.91
Utah average for urbanized areas	24.34	19.87	0.65
Washington average for urbanized areas	22.21	61.40	3.59
Antioch-Pittsburg, CA	77.9	520.0	6.68
Bakersfield, CA	36.2	0.8	0.02
Chico, CA	38.4	-8.2	-0.21
Davis, CA	na	na	na
Fairfield, CA	44.3	-4.0	-0.09
Fresno, CA	36.7	-6.7	-0.18
Hemet-San Jacinto, CA	64.2	-9.4	-0.15
Hesperia-Apple Valley-Victorville, CA	na	na	na
Indio-Coachella, CA	na	na	na
Lancaster-Palmdale, CA	232.3	-10.0	-0.04
Lodi, CA	na	na	na
Lompoc, CA	na	na	na
Los Angeles-Long Beach, CA	20.3	-0.1	-0.00
Merced, CA	na	na	na
Modesto, CA	44.5	4.3	0.10
Napa, CA	14.8	20.0	1.35
Oxnard-Ventura, CA	27.2	120.0	4.41
Palm Springs, CA	94.2	73.0	0.77
Redding, CA	48.2	-35.6	-0.74
Riverside-San Bernardino, CA	65.9	39.9	0.60
Sacramento, CA	37.8	14.1	0.37
Salinas, CA	48.0	705.0	14.70
San Diego, CA	37.8	8.5	0.23
San Francisco-Oakland, CA	13.8	2.2	0.16
San Jose, CA	15.4	-8.2	-0.53
San Luis Obispo, CA	na	na	na
Santa Barbara, CA	21.3	15.0	0.70
Santa Cruz, CA	23.6	37.7	1.60
Santa Maria, CA	55.5	35.0	0.63
Santa Rosa, CA	42.0	34.0	0.81
Seaside-Monterey, CA	15.4	51.5	3.34
Simi Valley, CA	60.2	1290.0	21.42
Stockton, CA	33.0	6.0	0.18
Vacaville, CA	na	na	na
Visalia, CA	41.8	2.5	0.06
Watsonville, CA	na	na	na
Yuba City , CA	26.3	-1.0	-0.04
Phoenix-Mesa, AZ	42.4	-15.1	-0.36
Tucson, AZ	28.7	66.9	2.33
Yuma, AZ	29.8	-12.0	-0.40
Boulder, CO	21.8	140.0	6.44
Colorado Springs, CO	27.5	24.9	0.90
Denver, CO	12.3	6.0	0.49
Fort Collins, CO	35.2	0.8	0.02
Grand Junction, CO	26.5	83.2	3.14
Greeley, CO	14.9	13.3	0.89
Longmount, CO	na	na	na
Pueblo, CO	-3.0	-10.0	3.33
Las Vegas, NV & AZ	61.1	30.1	0.49
Reno, NV	31.7	-12.9	-0.41
Albuquerque, NM	18.9	23.2	1.23
Las Cruces, NM	47.9	115.6	2.41
Santa Fe, NM	21.1	40.0	1.90
Eugene-Springfield, OR	3.7	-51.7	-14.09
Medford, OR	27.6	60.0	2.17
Portland-Vancouver, OR & WA	14.2	1.6	0.11
Salem, OR	15.7	2.7	0.17
Logan , UT	na	na	na
Ogden, UT	26.0	21.9	0.84
Provo-Orem, UT	30.0	43.3	1.45
Salt Lake City, UT	17.1	-5.7	-0.33
Bellingham, WA	16.3	166.7	10.26
Bremerton, WA	75.1	194.4	2.59
Longview, WA & OR	3.7	12.4	3.33
Olympia, WA	39.1	57.2	1.46
Richland-Kennewick-Pasco, WA	3.5	34.1	9.70
Seattle, WA	25.3	43.3	1.71
Spokane, WA	4.6	4.9	1.06
Tacoma, WA	23.7	32.9	1.39
Yakima, WA	8.6	6.7	0.78

Table 4
Farm Activity and Distribution of Population Changes for Metropolitan Areas in California and the Western United States

1990 Metropolitan Area Name	1987 Farm Land / Metropolitan Land	1997 Farm Land / Metropolitan Land	1987 to 1997 % Change in (Farm Land / Metropolitan Land)	1990 Central Place Population / Metro Population	1998 Central Place Population / Metro Population	1990 to 1998 % Change in (Central Place Population / Metro Population)
California average for (P)MSAs	0.470	0.443	-9.41	0.402	0.402	0.21
Arizona average for MSAs	0.327	0.260	-20.49	0.604	0.615	1.64
Colorado average for (P)MSAs	0.417	0.389	-4.97	0.520	0.515	-0.47
Nevada average for MSAs	0.155	0.118	-31.58	0.414	0.413	0.04
New Mexico average for MSAs	0.343	0.390	12.13	0.531	0.516	-2.55
Oregon average for (P)MSAs	0.218	0.203	-10.52	0.396	0.400	0.96
Utah average for MSAs	0.395	0.274	-30.57	0.407	0.387	-5.85
Washington average for (P)MSAs	0.273	0.265	4.46	0.358	0.340	-6.12
Bakersfield MSA, CA	0.583	0.547	-6.11	0.322	0.333	3.53
Chico-Paradise MSA, CA	0.471	0.385	-18.27	0.220	0.241	9.55
Fresno MSA, CA	0.527	0.487	-7.67	0.469	0.457	-2.43
LA-Long Beach PMSA, CA	0.108	0.050	-53.30	0.468	0.465	-0.60
Orange PMSA, CA	0.215	0.115	-46.63	0.278	0.271	-2.57
Riverside-San Bernardino PMSA, CA	0.125	0.082	-34.07	0.200	0.199	-0.53
Ventura PMSA, CA	0.278	0.293	5.26	0.138	0.134	-2.88
Merced MSA, CA	0.850	0.714	-15.97	0.315	0.300	-4.70
Modesta MSA, CA	0.753	0.766	1.79	0.558	0.543	-2.86
Redding MSA, CA	0.156	0.131	-16.06	0.452	0.474	4.92
Sacramento PMSA, CA	0.217	0.169	-22.33	0.276	0.264	-4.29
Yolo PMSA, CA	0.780	0.828	6.13	0.610	0.637	4.50
Salinas MSA, CA	0.651	0.726	11.51	0.396	0.417	5.50
San Diego MSA, CA	0.197	0.176	-10.39	0.499	0.492	-1.40
Oakland PMSA, CA	0.473	0.435	-8.06	0.265	0.238	-9.96
San Francisco PMSA, CA	0.356	0.299	-15.94	0.451	0.443	-1.86
San Jose PMSA, CA	0.421	0.386	-8.30	0.721	0.723	0.15
Santa Cruz-Watsonville PMSA, CA	0.194	0.249	28.82	0.349	0.355	1.70
Santa Rosa PMSA, CA	0.545	0.566	3.87	0.403	0.410	1.79
Vallejo-Fairfield-Napa PMSA, CA	0.572	0.567	-0.86	0.550	0.539	-1.96
Visalia-Tulare-Porterville MSA, CA	0.457	0.424	-7.14	0.444	0.467	5.18
SLO-Atasc-Paso Robles MSA, CA	0.683	0.616	-9.87	0.385	0.376	-2.31
Santa Barb-Santa Maria-Lom MSA, CA	0.496	0.466	-6.08	0.499	0.503	0.77
Stockton-Lodi MS, CA	0.920	0.903	-1.81	0.547	0.538	-1.55
Yuba City MSA, CA	0.733	0.705	-3.79	0.224	0.241	7.62
Phoenix-Mesa MSA, AZ	0.359	0.216	-39.94	0.689	0.655	-4.94
Tucson MSA, AZ	0.543	0.496	-8.80	0.608	0.717	18.00
Yuma MSA, AZ	0.077	0.067	-12.72	0.514	0.472	-8.13
Boulder-Longmount PMSA, CO	0.327	0.270	-17.58	0.599	0.571	-4.59
Colorado Springs MSA, CO	0.674	0.637	-5.54	0.708	0.704	-0.65
Denver PMSA, CO	0.545	0.544	-0.21	0.288	0.257	-10.65
Fort Collins-Loveland MSA, CO	0.345	0.326	-5.66	0.471	0.471	-0.10
Grand Junction MSA, CO	0.205	0.196	-4.63	0.312	0.366	17.27
Greeley MSA, CO	0.824	0.749	-9.10	0.459	0.442	-3.80
Pueblo MSA, CO	0.000	0.000	7.97	0.802	0.796	-0.75
Las Vegas NV & AZ, MSA	0.093	0.046	-50.81	0.303	0.306	1.00
Reno NV, MSA	0.217	0.190	-12.34	0.526	0.521	-0.92
Albuquerque MSA, NM	0.400	0.428	6.96	0.658	0.618	-6.12
Las Cruces MSA, NM	0.235	0.239	1.52	0.458	0.450	-1.87
Santa Fe MSA, NM	0.395	0.505	27.91	0.477	0.479	0.35
Eugene-Springfield MSA, OR	0.095	0.077	-19.11	0.556	0.570	2.43
Medford-Ashland MSA, OR	0.167	0.138	-17.55	0.321	0.330	2.94
Portland-Vancouver PMSA, OR	0.217	0.208	-4.30	0.319	0.317	-0.54
Salem PMSA, OR	0.392	0.387	-1.12	0.388	0.384	-1.00
Provo-Orem MSA, UT	0.386	0.293	-24.09	0.586	0.564	-3.68
Salt Lake City-Ogden MSA, UT	0.404	0.254	-37.06	0.229	0.210	-8.03
Bellingham MSA, WA	0.092	0.076	-16.90	0.408	0.395	-3.35
Bremerton PMSA, WA	0.038	0.075	99.76	0.201	0.170	-15.45
Olympia PMSA, WA	0.122	0.121	-0.88	0.210	0.194	-7.68
Richland-Kennewick-Pasco MSA,WA	0.692	0.624	-9.89	0.632	0.629	-0.42
Seattle-Bellevue-Everett PMSA, WA	0.055	0.042	-23.60	0.331	0.315	-4.71
Spokane MSA, WA	0.543	0.523	-3.79	0.490	0.450	-8.15
Tacoma PMSA, WA	0.055	0.047	-13.42	0.301	0.266	-11.80
Yakima MSA, WA	0.586	0.612	4.38	0.290	0.298	2.61

Table 5
Distribution of Retail Sales Changes for Metropolitan Areas in California and the Western States

1990 Metropolitan Area	1997 Central Place Retail Sales / Metro Retail Sales	1987 Central Place Retail Sales / Metro Retail Sales	1997 Central Place Retail Sales / Metro Retail Sales	1977 to 1987 % Change in Central Place Metro Retail Sales	1987 to 1997 % Change in (Central Place Retail Sales / Metro Retail Sales)	1977 to 1997 % Change in (Central Place Retail Sales / Metro Retail Sales)
California average for (P)MSAs	0.539	0.539	0.523	-0.580	-3.515	-4.733
Arizona average for MSAs	0.810	0.820	0.740	1.364	-9.754	-8.671
Colorado average for (P)MSAs	0.743	0.742	0.718	-1.303	-4.127	-5.380
Nevada average for MSAs	0.577	0.561	0.594	-2.844	7.178	4.136
New Mexico average for MSAs	0.860	0.877	0.883	1.947	0.772	2.687
Oregon average for (P)MSAs	0.588	0.578	0.603	-2.813	6.572	2.182
Utah average for MSAs	0.597	0.530	0.508	-11.063	-8.668	-18.927
Washington average for (P)MSAs	0.594	0.580	0.537	-3.209	-9.573	-10.989
Bakersfield MSA, CA	0.555	0.569	0.564	2.44	-0.83	1.59
Chico-Paradise MSA, CA	0.419	0.445	0.657	6.17	47.87	56.99
Fresno MSA, CA	0.583	0.636	0.588	9.11	-7.57	0.86
LA-Long Beach PMSA, CA	0.476	0.443	0.390	-7.06	-11.81	-18.03
Orange PMSA, CA	0.243	0.227	0.246	-6.73	8.66	1.34
Riverside-San Bernardino PMSA, CA	0.402	0.309	0.298	-23.16	-3.56	-25.90
Ventura PMSA, CA	0.240	0.239	0.193	-0.45	-19.19	-19.56
Merced MSA, CA	0.590	0.617	0.612	4.68	-0.85	3.80
Modesta MSA, CA	0.750	0.750	0.645	0.04	-13.93	-13.89
Redding MSA, CA	0.728	0.773	0.833	6.18	7.75	14.41
Sacramento PMSA, CA	0.306	0.278	0.232	-9.18	-16.61	-24.26
Yolo PMSA, CA	0.720	0.752	0.712	4.40	-5.32	-1.15
Salinas MSA, CA	0.606	0.605	0.564	-0.17	-6.65	-6.81
San Diego MSA, CA	0.550	0.523	0.533	-4.92	1.99	-3.03
Oakland PMSA, CA	0.280	0.252	0.192	-10.01	-23.92	-31.53
San Francisco PMSA, CA	0.468	0.445	0.402	-4.78	-9.71	-14.03
San Jose PMSA, CA	0.674	0.701	0.739	3.99	5.39	9.60
Santa Cruz-Watsonville PMSA, CA	0.645	0.548	0.447	-15.04	-18.40	-30.67
Santa Rosa PMSA, CA	0.554	0.688	0.660	24.16	-4.07	19.11
Vallejo-Fairfield-Napa PMSA, CA	0.867	0.807	0.824	-6.88	2.06	-4.96
Visalia-Tulare-Porterville MSA, CA	0.309	0.311	0.307	0.60	-1.29	-0.70
SLO-Atasc-Paso Robles MSA, CA	0.564	0.647	0.467	14.72	-27.77	-17.14
Santa Barb-Santa Maria-Lom MSA, CA	0.737	0.677	0.715	-8.13	5.64	-2.95
Stockton-Lodi MS, CA	0.670	0.711	0.625	6.07	-12.03	-6.69
Yuba City MSA, CA	na	0.534	0.621	na	16.26	na
Phoenix-Mesa MSA, AZ	0.798	0.810	0.762	1.48	-5.94	-4.55
Tucson MSA, AZ	0.840	0.823	0.784	-1.97	-4.81	-6.69
Yuma MSA, AZ	0.791	0.827	0.674	4.59	-18.51	-14.77
Boulder-Longmount PMSA, CO	0.775	0.789	0.796	1.77	0.97	2.76
Colorado Springs MSA, CO	0.903	0.920	0.931	1.84	1.23	3.09
Denver PMSA, CO	0.368	0.289	0.265	-21.32	-8.48	-27.99
Fort Collins-Loveland MSA, CO	0.599	0.639	0.589	6.80	-7.90	-1.63
Grand Junction MSA, CO	0.895	0.844	0.838	-5.75	-0.71	-6.42
Greeley MSA, CO	0.729	0.778	0.662	6.79	-14.93	-9.15
Pueblo MSA, CO	0.931	0.937	0.946	0.75	0.93	1.69
Las Vegas MSA, NV & AZ	0.393	0.383	0.424	-2.65	10.90	7.96
Reno MSA, NV	0.762	0.739	0.764	-3.04	3.45	0.31
Albuquerque MSA, NM	0.846	0.883	0.832	4.38	-5.79	-1.67
Las Cruces MSA, NM	0.902	0.896	0.902	-0.74	0.73	-0.02
Santa Fe MSA, NM	0.833	0.851	0.914	2.20	7.38	9.75
Eugene-Springfield MSA, OR	0.638	0.788	0.765	23.52	-2.92	19.91
Medford-Ashland MSA, OR	0.692	0.562	0.630	-18.84	12.13	-8.99
Portland-Vancouver PMSA, OR	0.407	0.330	0.388	-18.89	17.58	-4.63
Salem PMSA, OR	0.614	0.632	0.629	2.95	-0.50	2.43
Provo-Orem MSA, UT	0.751	0.662	0.727	-11.90	9.87	-3.20
Salt Lake City-Ogden MSA, UT	0.443	0.397	0.289	-10.23	-27.21	-34.65
Bellingham MSA, WA	0.691	0.675	0.673	-2.37	-0.16	-2.53
Bremerton PMSA, WA	0.600	0.403	0.269	-32.80	-33.18	-55.09
Olympia PMSA, WA	0.550	0.593	0.528	7.95	-11.06	-3.99
Richland-Kennewick-Pasco MSA, WA	0.656	0.861	0.903	31.14	4.94	37.62
Seattle-Belevue-Everett PMSA, WA	0.459	0.374	0.337	-18.51	-9.95	-26.62
Spokane MSA, WA	0.661	0.674	0.580	1.90	-13.99	-12.35
Tacoma PMSA, WA	0.510	0.465	0.399	-8.89	-14.18	-21.81
Yakima MSA, WA	0.625	0.599	0.605	-4.09	0.99	-3.15

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